USE OF CONTRACEPTION AND KNOWLEDGE OF HEALTH TECHNOLOGIES

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INTRODUCTION

Are the behavioral aspects of use of family planning and primary health care services linked? The question addresses a key assumption in the rationale of reproductive health programs. In this paper we address the basic hypothesis underlying this assumption: that women who use contraceptives are more likely to have knowledge of health technologies to improve child survival. They would also be more amenable to use available health services or seek the necessary health technologies to treat their child. The study seeks to elucidate the relationship between knowledge and use of contraception and knowledge and use of health technologies. The analysis looks at the determinants of knowledge and the relationship between knowledge and use of health technologies.

Both, use of contraception and improvement of child health involve a behavioral change. Adoption of contraception implies a conscious decision to modify behavior in order to attain a desired pattern of family formation. Changes in behavior however are contingent upon knowledge about the effective means of controlling fertility (Coale,1973). Similarly, changes in child survival also entail a series of behavioral changes. Decline of child mortality in developed countries at the beginning of the century was associated with changes in personal health behavior (Preston and Haines, 1991; Ewbank and Preston, 1990). These changes came about when the knowledge base of disease causation enabled individuals to modify behavior in order to attain better health.

Considerable resources are spent today in the promotion of health technologies such as immunization and use of oral re-

hydration therapy (ORT). While vertical interventions have been adopted because of their simplicity, their impact on child survival ultimately depends on the ability of the mother to use them effectively. A mother needs to know the immunization schedule the child requires and the proper way of using oral rehydration packets. But most important, a mother first has to understand the benefits of using these technologies and be able to acquire them at the appropriate time. Consequently, an integral part of both family planning programs and primary health care programs is the dissemination of information on contraception and child care that will result in better health of mothers and children.

Efforts to examine the links between family planning and child survival have focused largely on the effect of contraceptive use on maternal child health (MCH) and stress the biological consequences of changes in reproductive patterns (Hobcraft, 1987; United Nations, 1994). It is known that the use of contraception has a positive effect on child survival through increasing the length of birth intervals and decreasing the occurrence of higher order births. For society as a whole, the decline in the number of births and of high risk pregnancies results in less pressure on the health system.

Along with the new findings on the importance of birth-spacing and prevention of high risk births, came the acknowledgment that family planning did not translate automatically into improved child survival (Bongaarts,1987; Bongaarts, et al. 1988; Potter, 1988; Allman and Rohde, 1988). Bongaarts (1987) pointed out that in spite of the known physiological consequences of maternal age, high order births, and short birth intervals, the existence of offsetting mechanisms hinder the possible reductions in infant mortality derived from adoption of contraception. In particular, Bongaarts noted the increase in the proportion of first order births, and in births occurring at an interval shorter than two years.

The exchange that followed Bongaarts assertion (Bongaarts, Trussell, and Potter, 1988) served to highlight the behavioral aspects associated with the adoption of contraception and societal factors that remained unmeasured. Concurrent with the adoption of contraception other practices such as prolonged breastfeeding and postpartum abstinence also changed. At an aggregate level, the proportion of births born to mothers with low socioeconomic status increased.

The one aspect that remained unmeasured, was the effect that the use of health services had in the outcome of births. Adequate prenatal care, for example, is higher for women of high socioeconomic status which in turn are the most likely to adopt contraception. Also, use of modern health services mediates the effects on child survival of curtailed breastfeeding and influences the adoption of contraception (Potter, 1988).

While the biological relationships between child survival and fertility control have been well documented, little has been studied in terms of the joint use of the two interventions. Integration of these programs has occurred either through addition of family planning to existent health facilities or through appending health interventions to existing family planning programs (Sirageldin and Mosley, 1988). Research that examines the linkage between use of family planning and child survival varies considerably in its different approaches. Some examine the relationship from an institutional perspective while other focus on behavioral aspects. Interestingly, results also vary among the different studies.

Warren et.al. (1987) using data for Guatemala in 1983 and for Panama in 1984 examined the use of contraception according to whether women had used MCH services such as prenatal care, postpartum check up, and well baby care. The analysis is based on information from currently married women 15-44 whose last live birth was within five years of the interview. In both countries the proportion of women who use contraception

is significantly higher among women who have used more than one MCH service. Across all comparisons, contraception use was higher in Panama than in Guatemala and higher for non-indigenous women, and for urban residents. Results, as the authors acknowledge, do not permit an assessment of the influence of use of MCH services on the decision to use contraception. In both countries contraceptive use increases as parity increases while the use of MCH services remained constant.

The factors present in both the decision to use child survival interventions and contraceptive technology were examined by Wong and Agarwal (1992) for Tunisia using individual and community data collected in the 1988 Demographic Health Survey. The authors examine the socioeconomic and community characteristics associated with seeking treatment for a child with diarrhea and with using a modern contraceptive method. They conclude that different factors are associated with each of the health interventions examined. Socioeconomic and community characteristics are associated with seeking treatment for a child with diarrhea but not with using contraception. For contraception, it is the community characteristics that matter. Wong and Agarwal suggest that "using one intervention is an independent decision from the other."

Wilopo and Mosley (1993) in a study using data for West Timor island in Indonesia, test the hypothesis that decisions about practicing fertility control and using modern health interventions are made jointly. The authors argue that this decision is motivated by the desire to have a "limited number of healthy children." The hypothesis is tested using information at the individual, household, and community level. The analysis is carried out for ever use of a modern contraception and for use of all child survival interventions (maternal tetanus toxoid immunization, antenatal care, childhood immunizations and growth monitoring). Each dependent variable is included as an explanatory variable of the other. The study concludes that women living in

localities covered by child survival programs are more likely to use family planning. Use of family planning is even higher for women who are knowledgeable about child survival technologies. In terms of policy Wilopo and Mosley state that "governments can promote the diffusion of new ideas and behaviors like contraceptive practice indirectly as well as directly through a variety of institutions including well organized health programs."

Another examination of the impact of programs is carried out by Juárez (1992) who examined the availability of health and family planning services and education on fertility and child mortality levels. The study used individual and community data collected in the 1987 Demographic Health Survey of Ecuador. Juárez, claims that institutions establish norms and specific actions that affect the survival and fertility strategies. The analysis shows that the presence of health services is associated with a decline in infant mortality and fertility levels. The existence of educational services is also associated with lower levels of fertility and infant mortality. Although the data is analyzed at an aggregate level, the author interprets the trends as changes in individual behavior.

Hossain (1987) asserts that government interventions in schooling and health generate price alterations such that households reduce fertility and increase child survival. Using household and community data for Bangladesh, the author estimates the effect on public programs on child survival, fertility, and schooling. Results show that for fertility and child survival the presence of a family planning clinic has the biggest impact being the only public program that has a significant cross effect.

In an influential paper, Rosenzweig, and Schultz (1982) examined the hypothesis that education lowers the cost of using health and contraception technologies. The authors argued that education and health or family planning programs may substitute for each other by reducing prices and disseminating information.

They use individual and community data to assess the effects on child health and fertility of variations in education and on cost and availability of health services. Results show that the information role of education and health programs is larger for the less educated women. In addition, the authors claim that they are partial substitutes for one another.

The programmatic linkage of health and family planning were also examined by Sirageldin and Mosley (1988). The authors propose a framework on how family planning activities influence the health system. A first linkage refers to whether programs have purely demographic objectives or are integrated into the health system. Another linkage are the sociobiological influences on health of family planning programs. This influences, the authors argue, have a cost saving effect. Third, indirect linkages exist between family planning programs and health. These operate through different factors such as nutrition, income, and education.

The views on the linkage between family planning and child survival can be summarized into two broad premises. One view would postulate that it is volitional aspects that bring about both the adoption of fertility control and behavior that results in better child health. If this is the case and the two health technologies are available jointly then women will tend to use both simultaneously. If they are not, then it is better-off women who will seek both of them. Implicit in the alternative view is that it is the existence of institutional resources that bring about the joint utilization of the two technologies. The presence of services will trigger a simultaneous change in fertility and child survival. According to this view it is schooling that has the biggest impact on the link between the two. In other words, in the absence of institutional resources one would likely find very wide differentials in the utilization of family planning services and child survival technologies. What is not clear, however, is whether knowledge of health technologies is transmitted simultaneously or whether

other factors intervene to condition the transmission of specific knowledge about health technologies.

STUDY POPULATION

The way in which knowledge and use of contraception is related to knowledge and use of health technologies is examined in this paper using information from Bolivia (1989) and Guatemala (1987) collected in the Demographic and Health Surveys (DHS). In both countries contraceptive prevalence is low and infant mortality is among the highest of Latin America. Use of maternal-child health services, however, is different in the two countries.

Several characteristics of the study population make it particularly interesting. First fertility is high in both countries (TFR is 4.9 in Bolivia and 5.6 in Guatemala). While in both countries approximately 70% of the women knew at least one contraceptive method, contraceptive prevalence is below 20% in both of them. Infant mortality is also high in both countries (IMR in the five years before the survey was 96 per 1000 in Bolivia. In Guatemala it was 73.4 per 1000 for the ten years before the survey). Prenatal care, however, differs considerably in both countries. In Bolivia in 47% of the births reported the mother had received pre-natal care, in Guatemala in 72.9% of the reported births.

Ethnic differences are also an important element in studying knowledge and use of family planning and health technologies. Indigenous populations in both countries not only have different cultural traits than the rest of the population, but also speak a different language. These differences constitute an important barrier to access to knowledge about family planning and health technologies since the language in which almost all of the family planning and primary health programs are carried out is Spanish. While some indigenous people speak or understand Spanish, few read it or use it everyday.

Bolivia and Guatemala not only have the highest levels of fertility and mortality in Latin America, but also the largest differences in mortality levels between indigenous and non-indigenous populations. Differences in mortality have persisted even after a considerable decline in overall mortality rates. Mortality under 5 years of age was almost 20% higher for children of indigenous women in Guatemala (142 vs. 119.6) and more than 50% higher for children of indigenous women in Bolivia (185.8 vs. 122.3), according to results from recent DHS surveys (INE. Bolivia, IRD, 1990; MSPAS,INCAP, IRD, 1988).

In Guatemala 37.11 % of the population described themselves as indigenous in the Demographic Survey of 1989. In Bolivia, according to the Demographic Survey of 1988, 56% of the population 5 years of age or older spoke an indigenous language.

The population of Guatemala and Bolivia share other important socioeconomic characteristics. A large proportion of the population lives in rural areas (48.7% in Bolivia and 65.2% in Guatemala). In addition, in both countries a large percentage of the labor force is employed in agriculture (42.3% in Bolivia and 49.9% in Guatemala). In both countries the indigenous population is highly concentrated in the rural area. Almost 82% of the indigenous population lives in rural areas in Guatemala as does approximately two thirds of the indigenous population of Bolivia (INE. Bolivia, 1989; INE. Guatemala, 1988).

Educational levels are low in both countries. In Guatemala 42.4% of the population 7 years and older had never received any instruction and 45.8% had only completed primary school. In Bolivia 19.4% of those 5 or older had no instruction and 41.1% had attended at least one year of primary school.

THE ORGANIZATION OF HEALTH SYSTEMS AND FAMILY PLANNING PROGRAMS

In neither of the countries are child survival and family planning programs integrated. The organization of the health

systems is characterized by the existence of many uncoordinated institutions. In both countries the health sector includes private sector, social security organizations, and the Ministry of Health. The latter is supposed to cover all the population not covered by the other institutions. According to WHO, in Bolivia only 34% of the population had access to health services. In Guatemala this percentage was 50%. Both are among the lowest coverage in Latin America. According to the same source, only 17% of the population of Bolivia and 27% of the population of Guatemala are covered by social security (OPS, 1990).

In both countries family planning activities have been outside the domain of the government. In Guatemala, most of the information and distribution operations are concentrated in one NGO. In Bolivia, virtually no organization has family planning as its only activity; several NGOs provide family planning services as part of their reproductive health projects.

Health Sector in Bolivia

Resources managed by the Ministry of Health are organized at three levels. A first level consists of provision of ambulatory care and community activities. The district hospitals are part of the second level. A third level is formed by regional hospitals and specialized clinics. More than half of the professional personnel employed by the Ministry of Health is concentrated in the third level. The same occurs with technical personnel and auxiliary nurses.

A wide range of community activities are carried out by health posts. Those carried out by medical personnel include visits to schools and households. Non-medical personnel such as community health workers (*responsables populares de salud*) carry out other outreach activities. Other activities include the organization of women in mother's clubs and health committees. The impact of these outreach activities, although difficult to as-

sess accurately, seem to be rather minor. Statistics are reported at the aggregate level and include repeated activities.

Perhaps the main problem with the health sector is the uneven distribution of resources. The disparity between urban and rural areas is the largest one. The medical personnel of the Ministry of Health increased by 19% between 1981 and 1988 in the urban areas. In the rural areas it decreased by 1% during the same period of time (Ministerio de Previsión Social y Salud Pública, 1989). Table 1 illustrates this differences through a series of indicators estimated from the 1988 Population and Housing Survey.

No adequate statistics on morbidity or mortality exist in Bolivia, but infectious diseases continue to be the major public health problem. More than 20 thousand cases of malaria are reported every year. In spite of immunization efforts, cases of measles continue to be high among children. Tuberculosis rate is the highest in Latin America. The problem is aggravated by a low completion of treatment (67%).

Among children, diarrheal diseases and respiratory infections are among the highest in Latin America and the main cause of consultations and hospitalizations. Death from pneumonia among infants is the second highest reported for Latin America.

Although the government has in recent years developed a comprehensive maternal child health plan, coverage continues to be very low. In the year 1991, the births attended by the Ministry of Health and by the Social Security added up to 52,608. The estimated number of births in Bolivia is above 200 thousand a year.

Family Planning

Family planning activities began in Bolivia in 1974 when the Ministry of Health approved the inclusion of educational activities on fertility regulation. The activities were justified strictly in terms of women's health and were restricted to post-

partum visits. In 1975 the Maternal-Child Health program began to operate financed by UNFPA, WHO, and USAID (Sociedad Boliviana de Salud Pública, UNICEF, OPS, 1989).

The initiation of the program was shortly followed by strong pressures from the catholic church. Actions taken by the church caused a considerable delay in the implementation of the program. It was only in 1984 that family planning education and services were institutionalized and included as part of the maternal child health programs. To this date, several projects have been carried out by the Ministry of Health with support from international agencies. Activities include the supply of family planning methods and education of the medical personnel. Coverage, however, continues to be quite low. In 1992, for example, 20,382 women attended family planning consultations out of an estimated 720,000 potential users.

Given the difficulties that the government had in launching the reproductive health program, national and international NGOs took over the provision of family planning services and education. More than 90% of IUDs, pills, condoms, and tablets are currently supplied by NGOs. Family planning consultations are also provided mainly by NGOs. Since NGOs carry out their activities in the principal cities, 95% of family planning consultations take place in urban areas.

HEALTH SECTOR IN GUATEMALA

Even more than in Bolivia, provision of health services in Guatemala is characterized by lack of coordination. A diverse array of institutions provide curative health services. Adequate legislation to organize the provision of health care does not exist. The Ministry of Health and the Social Security Institute (*Instituto Guatemalteco de Seguridad Social)* are the main institutions of the health sector. Within the government, however, several other offices carry out health activities such as provision of ambulatory care or health insurance. Of the 641 registered NGOs only 30

have signed specific agreements with the Ministry of Health. Finally, the private sector performs numerous activities that range from the provision of ambulatory care to the sale of insurance, and distribution of medicines (IGSS.Guatemala, 1986).

In spite of the wide array of medical providers, actual coverage is as low as in Bolivia. Coverage by the Social Security Institute is approximately 13%. Coverage by the Ministry of Health is estimated to be 25% of the country's population. The private sector is concentrated mainly in the capital city of the country. Of the 2926 health clinics privately operated, 2077 are in the metropolitan area.

Overall, health resources are largely concentrated in the metropolitan region of the country. Of the personnel of the Ministry of Health 51% of medical professionals and 40% of auxiliary nurses are in the metropolitan region. Of those employed by the Social Security Institute, 60% are located in hospitals in the capital city (Dirección de Salud Pública y Asistencia Social, 1989).

The resources managed by the Ministry of Health which in most areas of the country is the only institution that provides health services are organized with urban areas as the core of a network that extends towards the rural areas. Services provided by the Ministry of Health are hospital, health centers, health posts, government or municipal pharmacies. Hospitals are located in the large urban centers and function as the main referral center for the area. Health centers are either type A with beds and in most cases laboratories or type B with fewer personnel and usually attended by only one doctor. Health centers type B are responsible for supervising the health posts which are run by an auxiliary nurse and a "rural health technician" (Ministerio de Salud Pública y Asistencia Social, 1989). Given that 70% of the population of Guatemala lives in rural areas, this organization of services means that auxiliary nurses or rural health technicians are the only resource for a majority of the population, and par-

ticularly for the indigenous population 80% of whom live in rural areas.

Services are heavily concentrated in the urban areas and particularly in the Metropolitan region where the capital city is located (see Table 2). All of the hospital beds are located in the urban areas and particularly in the departmental capitals. The number of beds per one thousand persons is similar in most of the regions except for the Metropolitan region (2.2) where it is more than twice the national average and in the North-West (0.4) where it is less than half the national average. The percentage of births attended by physician or birth attendant is less than half in most regions of the country. It is higher in the Metropolitan area (91%) and very low in the North (15.7%) and South-East (28%).

As in Bolivia, infectious diseases represent the major demand in the health system, and particularly infectious diseases among children. Under 5 mortality accounts for more than one third of the total number of deaths in the country. Intestinal infections represented the major cause of mortality in 1987. More than half of deaths due to intestinal infections occurred among children under 5. The same happens with respiratory infections and malnutrition which are the second and third cause of death in the country.

Diseases preventable through immunization have been declining with the exception of measles. In spite of recent immunization campaigns, measles continues to be an important cause of death among children. Among the adult population, malaria, dengue and tuberculosis are important causes of mortality.

In spite of the lack of adequate coverage, births exert considerable pressure over the health system. Only one fourth of births that occur in Guatemala annually are attended by physician. In the rural areas the percentage is only 15%, and among indigenous women a mere 8%. Consequently, perinatal and maternal deaths are rather high. The maternal mortality rate has been estimated at 12.9 per 10,000. In addition, complications of

pregnancy and birth account for 40% of hospitalizations in the country.

Family Planning

The major provider of family planning services in Guatemala is APROFAM, an NGO founded in 1964. APROFAM provides clinical services (prenatal, birth, delivery) through a network staffed by more than 121 medical professionals. Community services comprise a wide range of activities from training of health promoters in ORT, immunization and family planning, to dissemination of information and training of medical personnel.

Results from the Demographic Health Survey showed that approximately a third of contraceptive users identified APROFAM as the provider. Another source of contraceptives were the pharmacies. Overall, the population identifies family planning as a private activity.

The adoption of contraception technology in Guatemala has been very slow. There has been little change in use since 1983. A slight increase occurred from 1978 to 1983 among married women between 15-44 years of age. Virtually all of the change, however, is attributable to an increase in the number of women sterilized. Results from the 1987 DHS show that sterilization continues to be the most used method of fertility control. Among women of 30-34 years of age, half of those counted as current users of contraception are sterilized. The proportion is two thirds for women older than 35 years of age.

Overall, in both countries institutional factors and lack of resources have hindered the implementation of a maternal child health plan that integrates family planning and child survival interventions. The uneven distribution of health resources within the country is also an important deterrent to integration of fertility control and child survival. The implications for the present study are that: first, the health system did not offer women in either of the two countries the possibility of adhering to a compre-

hensive reproductive health strategy. Second, if women wanted to utilize both types of health technology due to a conscious decision, some women will be in a better position than others to do so.

Analytic Strategy

The relationship between history of family planning and knowledge and use of health technologies, is examined for a set of women for which the complete reproductive history since marriage is known, i.e., those that were married or in union not more than five years before the survey, have been married or in union only once, and have not had a child born more than five years before the survey. This includes 15% of all women interviewed (788 out of 5162) in Guatemala and 934 out of 7923 in Bolivia. In this way, differences between women are not largely influenced by changes over time in the availability of health services and contraceptive methods.

The information about specific knowledge refers to the time of the survey, and it is not possible to know the exact time of its acquisition. Given this fact, we constructed a series of measures that summarize each woman's experience with the use of child survival interventions and family planning (see appendix 1 for a list of variables).

In order to obtain an indicator of the timing of use of contraception we examined whether contraception was used before the first birth or not, and whether contraception was used for the purpose of spacing or stopping.

To summarize health behavior during pregnancy, we created several indicators of the care received or sought by the woman during pregnancy. Since the unit of analysis are the women and not the children a summary measure was created for each woman in order to distinguish whether attention was received for all births, for none of the births, or for at least one birth. The indicators summarize whether the woman sought or

received a tetanus toxoid injection during pregnancy, whether she received any type of prenatal care, and whether she received any assistance at delivery.

A separate summary measure was created for breastfeeding in order to measure the proportion of time that each woman had breastfed her children during the first year. The measure is computed as follows:

$$BF_j = \frac{\sum_{i=1}^{CEB_j} \frac{MB_{ij}}{\sum_{0}^{m} Months_{ij}}}{CEB_j}$$

where MB_i indicates the number of months that child i was breastfed, truncated at 12 months.

$\sum_{0}^{m} Months_{ij}$ indicates the number of months that the child i of mother j has been alive during the first year.

CEB_j is the number of children born alive to woman j.

BF_j takes the value of zero for woman j if she did not breastfeed any of her children, and the value of 1 if she breastfed all her children during 12 months or whatever portion of the year they have been or were alive. Values in between indicate the average proportion of time that each woman breastfed her children during the first year.

Two indicators of knowledge of contraception were created using information on spontaneous knowledge of contraception: whether the respondent knows any modern method, and whether she knows a source where to obtain a modern method.

We begin by examining the determinants of knowledge. We examine the association of three sets of factors. First, the woman's position to receive and take advantage of information and new technology (Place of residence, educational attainment,

ethnicity). Second, a set of indicators (described above) that summarize a woman's health behavior throughout her pregnancy history. And third, a set of indicators that summarize a woman's contraceptive experience.

Each of the variables representing knowledge is coded as a dichotomous variable. Accordingly, we estimate the following logit model:

$$\ln[\frac{P}{1-P}] = a + bX$$

where:

P	is the probability that woman has knowledge about oral rehydration solutions, a modern contraceptive or a source for a modern contraceptive.
a	is a constant.
b	is a vector of parameters to be estimated and
X	is a set of covariates.

Given that childbearing is what gives the woman the opportunity to come in contact with specific knowledge or services, we compare the estimates for all women to those who have had a child. In addition we control for number of children.

We then focus on specific knowledge of oral rehydration solution (ORS). The rationale to focus on this particular health technology is that in contrast with immunization it implies a modification of the knowledge base of the population. Since for diarrheal diseases it is not possible to achieve herd immunity, as it is the case with other infectious diseases, it cannot be the target of national one-time campaigns as it occurs with immunization. In addition, while knowledge about oral rehydration therapy is spread through the health system, it does not depend on the existence of health infrastructure.

RESULTS

Tables 3 and 4 show the association between a woman's characteristics and her knowledge of oral rehydration and contraception. We include those predetermined variables that may affect the woman's ability to acquire knowledge.

In both countries residence in an urban area is an important determinant of knowledge of contraception but not of oral rehydration. This result summarizes the situation of health services outlined above. In both countries health activities—family planning and curative services—are concentrated in the urban areas. In addition, oral rehydration has been emphasized as especially suitable for the rural areas where health services are not easily accessible.

As expected, education and particularly secondary education is an important determinant of the acquisition of knowledge. The difference in knowledge between women of different educational levels is important in Guatemala but not in Bolivia. In Guatemala differences by educational level increase when controlling for children ever born. In Bolivia, in contrast, they tend to decrease.

Indigenous women are in a particular disadvantaged position. In Guatemala being indigenous has a strong negative effect on specific knowledge. The effect is consistent despite the number of children that a woman has. Interestingly, in Bolivia being indigenous is not a disadvantage to acquire knowledge of oral rehydration. Again, this is consistent with the fact that in Bolivia a large percentage of the indigenous population lives in the rural areas where ORS campaigns have been carried out.

Exposure to information, as measured by ownership of a radio and by having heard the family planning message has a different effect on both countries. In Guatemala it is important for knowledge of contraception but not for knowledge of oral rehydration. In Bolivia the opposite occurs, those with a radio are more likely to have knowledge of oral rehydration, and having

heard the family planning message appears to have no impact on knowledge.

Tables 5 and 6 explore the relationship between health behavior and knowledge. Health behavior is summarized by whether a woman received prenatal care, has received a tetanus toxoid immunization, and the proportion of time that she has breastfed her children. Results show that having received prenatal care for at least one child is the single most important determinant of having specific knowledge of a health technology.

In both countries breastfeeding has a strong negative relation with knowledge. It is particularly strong for knowledge of contraception. Given that the variable summarizes the whole experience of each woman with breastfeeding it probably identifies a group of women that either due to residence or culture have different health behavior and knowledge. Furthermore, these results seem consistent with the assertion that women who adopt contraception also modify their behavior in other ways (Bongaarts, 1987; Potter, 1988).

In Bolivia, having received a tetanus toxoid immunization in any of the pregnancies does not have a definite influence on knowledge except for knowledge of a source for modern contraception. In Guatemala, it has a stronger influence on knowledge of oral rehydration than on source for modern contraception, and no relation to knowledge of modern contraception. In both countries the maternal child health guidelines call for vaccination of any pregnant woman that comes in contact with a health establishment. The difference between the two countries might be an indication that in Guatemala to learn about oral rehydration it is necessary to come in contact with a health establishment, but not in Bolivia. Such interpretation is consistent with the fact that in Bolivia at the time of the survey a strong ORT campaign was under way. In Guatemala ORT promotion has only begun in recent years.

Table 7 shows the relationship between knowledge and history of contraceptive use. In both countries ever use of contraception is positively and significantly associated to acquisition of knowledge. Curiously, spacing does not show any strong association with knowledge. Having used contraception before the first birth seems to identify a group of women who have not yet had extensive contact with the health system.

To integrate the determinants of knowledge of ORS we have estimated a set of equations using the three sets of variables discussed above (Table 8 and Table 9). In Guatemala, education and ethnicity are the most important factors influencing knowledge of ORS. Contact with the health system is positively and significantly associated with knowledge of ORS. The coefficients for these two sets of variables are rather consistent in all the equations.

The variables related to contraceptive use show different results. Having used contraception before the first birth is negatively associated to knowledge of ORS. Ever use, however, has a strong and positive effect and a strong effect when it is included with BEFORE (i.e., use of contraception before first birth) but is much weaker by itself. In particular having used contraception before the first birth seems to identify a set of women with different characteristics.

For Guatemala, when the three sets of variables are included in the analysis, their significance changes. Education and indigenous have a stronger effect than in the previous models. The importance of tetanus toxoid and prenatal care is inverted. Having used contraception before the first birth has a stronger effect than ever use of any method.

In Bolivia, education and having received prenatal care have a strong effect on knowledge of ORS. Interestingly, in the case of Bolivia, being indigenous was not significant in any of the models. The inclusion of prenatal care modifies the significance

of the other variables, in particular the differences between educational levels.

The last two columns of the table show separate estimations for urban and rural areas. It is worth noting the sharp difference between the two. In the rural areas education and listening to a radio are the more important determinants of knowledge of ORS. In the urban areas the effect of the two variables is not significant. Again, this is consistent with the disparity in the distribution of services and health personnel. It highlights, however, that even in rural areas, the position of a woman is what will enable her to take advantage of health technologies.

Finally, to assess the influence that the presence of a health facility has, the percentage of women with specific knowledge or behavior was estimated. Results are presented in Table 10. Unfortunately, information on health facility is only available for Guatemala. In addition, several clusters of the Metropolitan Region do not have health center information. To be able to include all the data, we created a category to identify the missing values. The results are presented only for distance to a health service with family planning services since they are almost identical to those for distance to a health center with ORT services and to distance to a health center with MCH services.

As distance to a health center increases, the percentage of women with specific knowledge or that have had access to health technologies decreases. The decrease is sharper, however, for those variables related to use of knowledge and use of family planning.

CONCLUSION

In both countries the way in which health services are provided thwarts the possibility of acquiring knowledge about family planning and health technologies simultaneously. Provision of family planning services in Bolivia and Guatemala, have

been organized separately from the main organization of health services.

Private initiatives and NGOs play an important role in the dissemination of information and distribution of contraceptive methods. In both countries there is also considerable difference in the possibility of obtaining family planning services between urban and rural areas. Given the difficulties in accessing health services, it is the relative position of women that has a strong influence on the knowledge about health technology that they have. In both countries education and ethnicity strongly influence the ability of a woman to benefit from existing knowledge. Differences between women of different educational levels are greater in Guatemala than in Bolivia.

This relative position of women, however, is not an insurmountable obstacle to dissemination of specific knowledge about health technology. There is indication that when programs have specific targets, they can overcome certain barriers. Promotion of ORT has been directed to areas with difficult access to health services and to populations that face important barriers. Accordingly, residence in a rural area had no importance for acquisition of knowledge about ORS. Furthermore, in Bolivia ethnicity was not an important determinant of knowledge of ORS.

Contact with the health establishments is also an important element in the acquisition of knowledge about health technologies. Even when contact is not systematic, as is apparently the case with tetanus toxoid immunization, it has an important influence on acquisition of knowledge.

Conclusions about the importance of contraceptive use for the acquisition of health knowledge are mixed. On the one hand there is evidence that for a group of women acquisition of knowledge is much less costly than for others. On the other hand for these women purchasing health care may be economical enough so that they do not need to acquire knowledge about health technology. This seems to be the case for those women

who use contraception before the first birth. This might be particularly true in countries such as Bolivia and Guatemala with large disparities in the distribution of health resources.

An important measurement issue, however, needs to be further studied. While it is usually assumed that child survival and use of contraception are endogenous, it is not clear that it is always so. The relationship might depend on the particular setting where it is studied. In countries such as Bolivia and Guatemala where family planning and child survival provision is, not only not integrated, but rather independent of each other, the acquisition of knowledge could possibly be triggered by a different set of factors.

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TABLE 1. BOLIVIA. SELECTED CHARACTERISTICS BY REGION

	Proportion					
Department	Under 5 Mortality (q)5	With Electricity	Illiterate	Indigenous	With Radio at Home	With Piped Water in the Home
(A) Urban						
Chuquisaca	0.1082	0.90	0.13	0.02	0.54	0.65
La Paz	0.1199	0.95	0.07	0.01	0.65	0.51
Cochabamba	0.1279	0.96	0.05	0.01	0.49	0.77
Oruro	0.1471	0.93	0.03	0.00	0.41	0.85
Potosa	0.1896	0.94	0.12	0.04	0.41	0.73
Tarija	0.1021	0.83	0.10	0.00	0.76	0.86
Santa Cruz	0.1012	0.88	0.04	0.00	0.53	0.71
Beni	0.1101	0.70	0.03	0.00	0.70	0.70
Pando	0.0937	0.78	0.02	0.01	0.67	0.87
(B) Rural						
Chuquisaca	0.1690	0.13	0.53	0.29	0.17	0.01
La Paz	0.1701	0.36	0.18	0.08	0.17	0.04
Cochabamba	0.2491	0.39	0.32	0.26	0.11	0.36
Oruro	0.2053	0.34	0.13	0.04	0.15	0.14
Potosa	0.2434	0.13	0.37	0.28	0.11	0.25
Tarija	0.1466	0.23	0.30	0.00	0.19	0.28
Santa Cruz	0.1300	0.31	0.13	0.08	0.14	0.15
Beni	0.1427	0.13	0.12	0.00	0.30	0.28
Pando	0.1843	0.08	0.14	0.14	0.19	0.18

Source: INE. Bolivia. Encuesta Nacional de Población y Vivienda

TABLE 2. GUATEMALA. SELECTED CHARACTERISTICS, BY REGIONS

Region	Population	Distribution by Regions	Percentage Indigenous	Percentage with No Schooling	Households	
					Without Toilet	With Water From River
Metropolitan	1,638,828	20.1	19.3	16.2	8.7	3.9
North	607,650	7.4	90.6	51.0	47.3	44.4
North-East	792,442	9.7	2.6	33.3	40.5	19.5
South-East	784,560	9.6	3.1	29.3	51.1	18.6
Central	885,257	10.8	33.4	28.5	21.3	2.9
North-West	1,073,529	13.2	82.3	48.2	56.6	36.3
South-west	2,203,711	27.0	58.7	34.6	38.0	12.8
Peten	176,552	2.2	19.2	28.3	47.0	37.6
Total	8,162,529	100.0	41.9	32.5	34.7	16.8

	Hospital Beds Per 1000 Pop.	Births Attended by Physician	Percentage Below Poverty Line	Percentage Indigent
Metropolitan	2.2	91.4	64.3	30.0
North	0.8	15.7	91.7	77.8
North-East	1.0	40.3	75.7	53.6
South-East	0.7	28.0	82.2	64.6
Central	0.7	69.6	82.0	59.1
North-West	0.4	45.0	90.6	80.7
South-west	0.7	59.5	83.4	66.9
Peten	0.9	43.4	77.3	53.6
Total	1.0	51.3		

Source: INE. Guatemala, 1989; Ministry of Health, 1991. INE. Guatemala, 1991.

TABLE 3. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSIONS OF WOMEN'S CHARACTERISTICS ON KNOWLEDGE OF HEALTH TECHNOLOGIES, GUATEMALA 1987

Variables	Knowledge of ORT		Knowledge of Modern Contraceptive		Knowledge of Source for Modern Contraceptive	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
All Women						
urban	0.3267	0.1918	1.2136	0.2323 ++	1.3177	0.2238 ++
edprim	0.6955	0.2003 ++	0.8307	0.1926 ++	0.6002	0.2042 ++
edsec	0.8963	0.2840 ++	1.9472	0.4214 ++	2.9286	0.5072 ++
radio	*-0.0323*	*0.1762*	*-0.0903*	*0.1872*	*0.2024*	*0.1926*
message	0.3015	0.1763	0.8444	0.1850 ++	0.5683	0.1910 ++
indigen	-1.6038	0.2611 ++	-1.658	0.2203 ++	-2.0822	0.2820 ++
Intercept	-1.0275	0.2038 ++	-0.6284	0.1955 ++	-1.1216	0.2117 ++
Women with at Least One Child						
urban	0.3628	0.2136	1.1874	0.2567 ++	1.3153	0.2532 ++
edprim	0.8167	0.2147 ++	0.7686	0.2155 ++	0.5068	0.2283 +
edsec	1.188	0.3255 ++	2.1114	0.5161 ++	3.4572	0.7552 ++
radio	0.15	0.1911	-0.0613	0.2064	0.3037	0.2135
message	0.0769	0.1983	0.691	0.2076 ++	0.3731	0.2163
indigen	-1.7495	0.2707 ++	-1.6887	0.2470 ++	-2.3725	0.3309 ++
Intercept	-0.6872	0.2203 ++	-0.4885	0.2201 +	-0.9003	0.2362 ++
Women with at Least One Child						
urban	0.4114	0.218	1.2021	0.2570 ++	1.3914	0.2575 ++
edprim	0.911	0.2238 ++	0.8015	0.2183 ++	0.5634	0.2360 +
edsec	1.3437	0.3349 ++	2.1788	0.5182 ++	3.5953	0.7592 ++
radio	0.1321	0.1967	-0.0808	0.2083	0.2811	0.2188
message	0.1292	0.2036	0.7213	0.2094 ++	0.4451	0.2219 +
indigen	-1.7462	0.2763 ++	-1.6805	0.2492 ++	-2.4046	0.3384 ++
CEB	0.7071	0.1362 ++	0.3598	0.1419 +	0.6527	0.1497 ++
Intercept	-1.9203	0.3331 ++	-1.0971	0.3281 ++	-2.0396	0.3626

\+ significant at .05 level

++ significant at .01 level

Source: Demographic Health Survey, Guatemala 1987

TABLE 4. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSIONS OF WOMEN'S CHARACTERISTICS ON KNOWLEDGE OF HEALTH TECHNOLOGIES. BOLIVIA 1989

Variables	Knowledge of ORT		Knowledge of Modern Contraceptive		Knowledge of Source for Modern Contraceptive	
	Coefficient	Std. Error	Coefficient	Std Error	Coefficient	Std. Error
All Women						
urban	0.1608	0.1617	0.6013	0.1840 ++	0.3378	0.1675 +
edprim	1.2836	0.4202 ++	0.9387	0.6373	1.6864	0.4139 ++
edsec	1.8423	0.4371 ++	2.415	0.6402 ++	2.595	0.4318 ++
radio	0.4132	0.1908 +	0.0482	0.2283	0.0256	0.1905
message	0.2112	0.1555	0.3199	0.1699	0.1206	0.1708
indigen	-0.3214	0.2207	-1.174	0.3389 ++	-1.2319	0.2134 ++
Intercept	-2.4555	0.4572 ++	-2.9033	0.6660 ++	-1.6574	0.4452 ++
Women with at Least One Child						
urban	0.1767	0.1748	0.7454	0.2031 ++	0.4687	0.1830 +
edprim	1.3469	0.4249 ++	2.5702	1.4594	1.8875	0.4935 ++
edsec	2.0984	0.4468 ++	3.9661	1.4618 ++	2.7065	0.5128 ++
radio	0.4648	0.2014 +	0.1077	0.2531	-0.047	0.2138
message	0.3339	0.1723	0.2616	0.188	0.1153	0.1916
indigen	-0.2608	0.2346	-1.2575	0.4020 ++	-1.3458	0.2415 ++
Intercept	-2.339	0.4710 ++	-4.5688	1.4760 ++	-1.8065	0.5265 ++
Women with at Least One Child						
urban	0.2107	0.1775	0.7607	0.2039 ++	0.4729	0.1832 ++
edprim	1.3967	0.4304 ++	2.5719	1.4597	1.8883	0.4936 ++
edsec	2.2034	0.4541 ++	3.9845	1.4623 ++	2.7126	0.5130 ++
radio	0.5269	0.2051 ++	0.1235	0.2536	-0.0367	0.2142
message	0.3523	0.1749 +	0.2639	0.1884	0.1175	0.1917
indigen	-0.2579	0.2378	-1.2497	0.4023 ++	-1.3442	0.2415 ++
CEB	0.5532	0.1223 ++	0.1821	0.1368	0.0927	0.1286
Intercept	-3.3396	0.5334 ++	-4.884	1.4964 ++	-1.9632	0.5704 ++

+ significant at .05 level
++ significant at .01 level
Source Demographic and Health Survey Bolivia 1989

TABLE 5. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSION OF HEALTH BEHAVIOR ON KNOWLEDGE OF HEALTH TECHNOLOGIES. GUATEMALA 1987.

Variables	*Knowledge of ORT*		*Knowledge of Modern Contraceptive*		*Knowledge of Source for Modern Contraceptive*	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
All Women						
ttox	1.0592	0.2200 ++	0.0668	0.2266	0.5191	0.2274 +
prenat	1.5108	0.1686 ++	2.0865	0.1804 ++	1.6127	0.1737 ++
bfeeding	0.7312	0.2300 ++	-1.0929	0.2098 ++	-0.8696	0.1971 ++
Intercept	-1.9284	0.1871 ++	-0.3470	0.1409 +	0.0712	0.1390
Women with at Least One Child						
ttox	0.8918	0.2145 ++	0.0217	0.2276	0.4933	0.2289 +
prenat	1.1295	0.1712 ++	2.0179	0.1859 ++	1.5711	0.1791 ++
bfeeding	-0.6395	0.2896 +	-1.5030	0.3216 ++	-1.1167	0.3153 ++
Intercept	-0.4988	0.2583	0.0587	0.2765	0.3120	0.2758
Women with at Least One Child						
ttox	0.8318	0.2179 ++	-0.0149	0.2296	0.4880	0.2297 +
prenat	1.1730	0.1741 ++	2.0399	0.1874 ++	1.5730	0.1792 ++
bfeeding	-0.3457	0.3051	-1.3423	0.3314 ++	-1.0883	0.3295 ++
CEB	0.4693	0.1277 ++	0.2436	0.1348	0.0373	0.1308
Intercept	-1.4828	0.3775 ++	-0.4588	0.3961	0.2307	0.3955

\+ Significant at .05 level

++ Significant at .01 level

Source: Demographic Health Survey, Guatemala 1987

TABLE 6. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSION OF HEALTH BEHAVIOR ON KNOWLEDGE OF HEALTH TECHNOLOGIES. BOLIVIA 1989.

Variables	Knowledge of ORT		Knowledge of Modern Contraceptive		Knowledge of Source for Modern Contraceptive	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
All Women						
ttox	0.2862	0.1725	-0.3138	0.1827	0.5299	0.1827 ++
prenat	1.7351	0.1659 ++	1.8682	0.1893 ++	1.4801	0.1602 ++
bfeeding	0.7451	0.2194 ++	-1.4312	0.2199 ++	-1.3520	0.1985 ++
Intercept	-2.0867	0.1854 ++	-0.8721	0.1452 ++	0.2983	0.1361 +
Women with at Least One Child						
ttox	0.1476	0.1687	-0.2789	0.1826	0.5397	0.1827 ++
prenat	1.3237	0.1661 ++	2.0174	0.2183 ++	1.4991	0.1646 ++
bfeeding	-0.4208	0.2714	-1.1463	0.2881 ++	-1.2464	0.3088 ++
Intercept	-0.7544	0.2557 ++	-1.2472	0.2909 ++	0.1918	0.2762
Women with at Least One Child						
ttox	0.1276	0.1698	-0.2789	0.1826	0.5510	0.1833 ++
prenat	1.4471	0.1722 ++	2.0167	0.2195 ++	1.4746	0.1659 ++
bfeeding	-0.0778	0.2851	-1.1485	0.2979 ++	-1.3898	0.3421 ++
CEB	0.4985	0.1246 ++	-0.0038	0.1321	-0.1447	0.1312
Intercept	-1.8592	0.3791 ++	-1.2392	0.4017 ++	0.5409	0.4258

\+ Significant at .05 level
++ Significant at .01 level
Source Demographic and Health Survey Bolivia 1989

TABLE 7. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSION OF CONTRACEPTIVE USE ON KNOWLEDGE OF ORT

Variable	Guatemala		Bolivia	
	Coefficient	Std. Error	Coefficient	Std. Error
before	-2.1874	0.4184 ++	-0.4784	0.2325 +
spacing	-0.8287	0.4629	-0.5240	0.2474 +
Ever Use	2.7542	0.4338 ++	1.5778	0.2384 ++
Intercept	-0.9944	0.0911 ++	-0.9424	.0920 ++
Women with at Least One Child				
before	-0.2009	1.1243	0.2977	0.2728
spacing	1.3821	0.7909	-0.4517	0.2620
Ever Use	3.0738	0.5491 ++	1.2318	0.2477 ++
Intercept	-0.8019	0.0989 ++	-0.5883	0.0966 ++
before	*-1.1889*	*0.4801 +*	*0.4345*	*0.2774*
spacing	-0.3877	0.4570	-0.3718	0.2650
Ever Use	2.0141	0.4238 ++	1.1730	0.2498 ++
CEB	0.4313	0.1231 ++	0.4147	0.1157 ++
Intercept	-1.3206	0.2200 ++	-1.2412	0.2085 ++

\+ Significant at .05 level

++ Significant at .01 level

Source: Demographic Health Survey Guatemala, 1987 Demographic Health Survey Bolivia, 1989

TABLE 8. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSION PREDICTING KNOWLEDGE OF ORT GUATEMALA, 1987

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	Std. Error	Coeff.	Std. Error.	Coeff.	Std. Error	Coeff.	Std. Error
edprim	0.889	0.231 ++	0.942	0.229 ++	0.904	0.232 ++	0.871	0.233 ++
edsec	1.480	0.346 ++	1.741	0.333 ++	1.163	0.328 ++	1.451	0.346 ++
indigen	-1.229	0.243 ++	-1.344	0.240 ++	-1.249	0.244 ++	-1.129	0.251 ++
CEB	0.971	0.124 ++	1.034	0.123 ++	1.036	0.123 ++	1.000	0.124 ++
ttox	0.953	0.245 ++	0.879	0.242 ++	0.915	0.243 ++	0.922	0.246 ++
prenat	0.607	0.206 ++	0.774	0.199 ++	0.697	0.201 ++	0.648	0.205 ++
before	-1.952	0.489 ++	-1.416	0.468 ++			-1.501	0.463 ++
Ever Use	0.944	0.264 ++			0.565	0.238 +		
Intercept	-2.847	0.293 ++	-2.839	0.290 ++	-2.943	0.293 ++	-3.071	0.307 ++

\+ Significant at .05 level

++ Significant at .01 level

Source: Demographic Health Survey Guatemala, 1987

TABLE 9. COEFFICIENTS AND STANDARD ERRORS OF LOGISTIC REGRESSION PREDICTING KNOWLEDGE OF ORT. BOLIVIA 1989

Variable	Model 1		Model 2		Model 3	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
edprim	1.636	0.436 ++	1.203	0.443 ++	1.207	0.442 ++
edsec	2.553	0.445 ++	1.704	0.458 ++	1.776	0.454 ++
radio	0.604	0.206 ++	0.567	0.212 ++	0.600	0.210 ++
message	0.372	0.168 +	0.235	0.176		
CEB	1.111	0.104 ++	0.975	0.113 ++	0.966	0.113 ++
prenat			1.338	0.176 ++	1.359	0.175 ++
Ever Use			0.425	0.172 +	0.431	0.172 +
Intercept	-4.635	0.487 ++	-4.717	0.502 ++	-4.685	0.500 ++

	Urban Area		Rural Area	
Variable	Coefficient	Std. Error	Coefficient	Std. Error
edprim	0.333	0.536	2.413	1.073 +
edsec	0.854	0.536	3.158	1.101 ++
radio	0.094	0.261	1.197	0.385 ++
CEB	1.069	0.145 ++	0.884	0.191 ++
prenat	1.207	0.222 ++	1.370	0.300 ++
Ever Use	0.425	0.204 +	0.421	0.327
Intercept	-3.396	0.605 ++	-6.283	1.168 ++

\+ Significant at .05 level

++ Significant at .01 level

Source: Demographic Health Survey Bolivia, 1989

TABLE 10. PERCENTAGE OF WOMEN WITH SPECIFIC KNOWLEDGE AND USE OF HEALTH SERVICES BY DISTANCE TO HEALTH CENTER WITH FAMILY PLANNING SERVICE

	KNOWS ORT	KNOW MOD	KNOW SOUR	PRENAT	EVER USE	ASTDEL	TTOX
0 kms	26%	54	67	25	29	22	10
N	1619	1458	1619	1458	1619	1458	1458
1-5 kms	23%	40	57	21	19	16	11
N	1468	1285	1468	1285	1468	1285	1285
More 5 kms	21%	27	46	18	12	14	10
N	999	864	999	864	999	864	864
Missing	21%	74	81	25	40	28	7
N	1074	1001	1074	1001	1074	1001	1001

Source: Demographic and Health Survey, Guatemala 1987

APPENDIX 1

Variable	Name Definition
Urban	Place of residence is an urban area. Variable is coded 1 for urban areas and 0 for rural areas.
Education	
edprim	Woman has at least one year of primary education.
edsec	Woman has at least one year of secondary education.
	Reference category is No Education
radio	Whether the woman listens to the radio (yes=1, no=0).
message	Whether the woman has ever listened to the family planning message (yes=1, no=0).
indigen	For Guatemala, whether the woman was identified as indigenous or "Ladina" (if indigenous indigen=1). For Bolivia, indigenous women are those who said the predominant language used in the household is an indigenous one or whether she answered a questionnaire not in Spanish.
ttox	Whether the woman received a tetanus toxoid shot in any of the pregnancies (yes=1, no=0).
prenat	Whether the woman received prenatal care in any of the pregnancies (yes=1, no=0).
astdel	Whether the woman received assistance at delivery by medical personnel in any of the pregnancies (yes=1, no=0).
bfeeding	Average proportion of time that each woman breastfed her children (see text for a full explanation of this variable).
CEB	Total children ever born as coded in the DHS standard recode files.
before	Whether the woman used contraception before the first birth (yes=1, no=0).

spacing	Whether the woman used contraception for spacing purposes. These are women who used contraception between intended pregnancies.
Ever use	Ever use of any method as coded in the DHS standard recode files.
knowsors	Whether the woman knows about Oral Rehydration packets (yes=1, no=0).
knowmod	Whether the woman knows a modern contraceptive method spontaneously (yes=1, no=0).
knowsour	Whether the woman knows a source for a modern contraceptive method (yes=1, no=0).